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References: WHC-CM-3-4

Purpose		New ID Number
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Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature) C. HEIDEN RP Henckel for — Date 10/1/91

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1.0 INTRODUCTION

In October of 1990, an Agreement in Principle between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA) and the State of Washington Department of Ecology (Ecology) was signed indicating the 618-9 Burial Ground to be an expedited response action (ERA) candidate. Based on EPA and Ecology review of the ERA proposal, the Westinghouse Hanford Company (Westinghouse Hanford) was authorized to proceed with planning and nonintrusive field work in December of 1990. The 618-9 Burial Ground has been included in the 300-FF-2 operable unit as designated by the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1990).

The 618-9 Burial Ground ERA will proceed in two phases. The first phase will include drum excavation, sampling, transfer of liquids, and waste designation. Field work for the first phase commenced in February 1991. The second phase will consist of soil/liquid treatment or disposal.

2.0 SITE DESCRIPTION

The 618-9 Burial Ground is located within the 600 Area, approximately 910 m (1,000 yd) west of Stevens Drive, opposite the 300 North Area parking lot, on the DOE-managed Hanford Site. Figure 1 shows the location of the 618-9 Burial Ground. It is a single trench approximately 47 to 67 m (140 to 200 ft) long, 3.3 to 6 m (10 to 18 ft) wide and 2.6 m (13 ft) deep. The trench was active from 1950 to 1956 and has since been backfilled. The burial ground is presently surrounded by a 108- by 108-m (325- by 325-ft) chain link fence. A ground-penetrating radar survey was conducted prior to the commencement of field activities for phase one in response to the unknown arrangement of the drums under the soil. Excavating activities conducted at the site to date have uncovered the buried drums on the west end of the trench. The location of buried drums and other objects will be documented.

3.0 SCOPE/PURPOSE

This sampling plan is in support of soil sampling for the 618-9 Burial Ground ERA. The scope is to collect soil samples following the removal of drums from the excavated trench for characterization to determine the nature and extent of contamination, if any. Stratified random and authoritative samples will be taken from three strata within the trench as described in this sampling plan in Chapter 7.0, Sampling Activities. In response to the high degree of unknown conditions prior to conducting excavating activities, the sampling parameters proposed in this plan should be regarded as guidelines with changes being contingent on the findings and completion of excavation activities.

Figure 1. Location of 618-9 Burial Ground.

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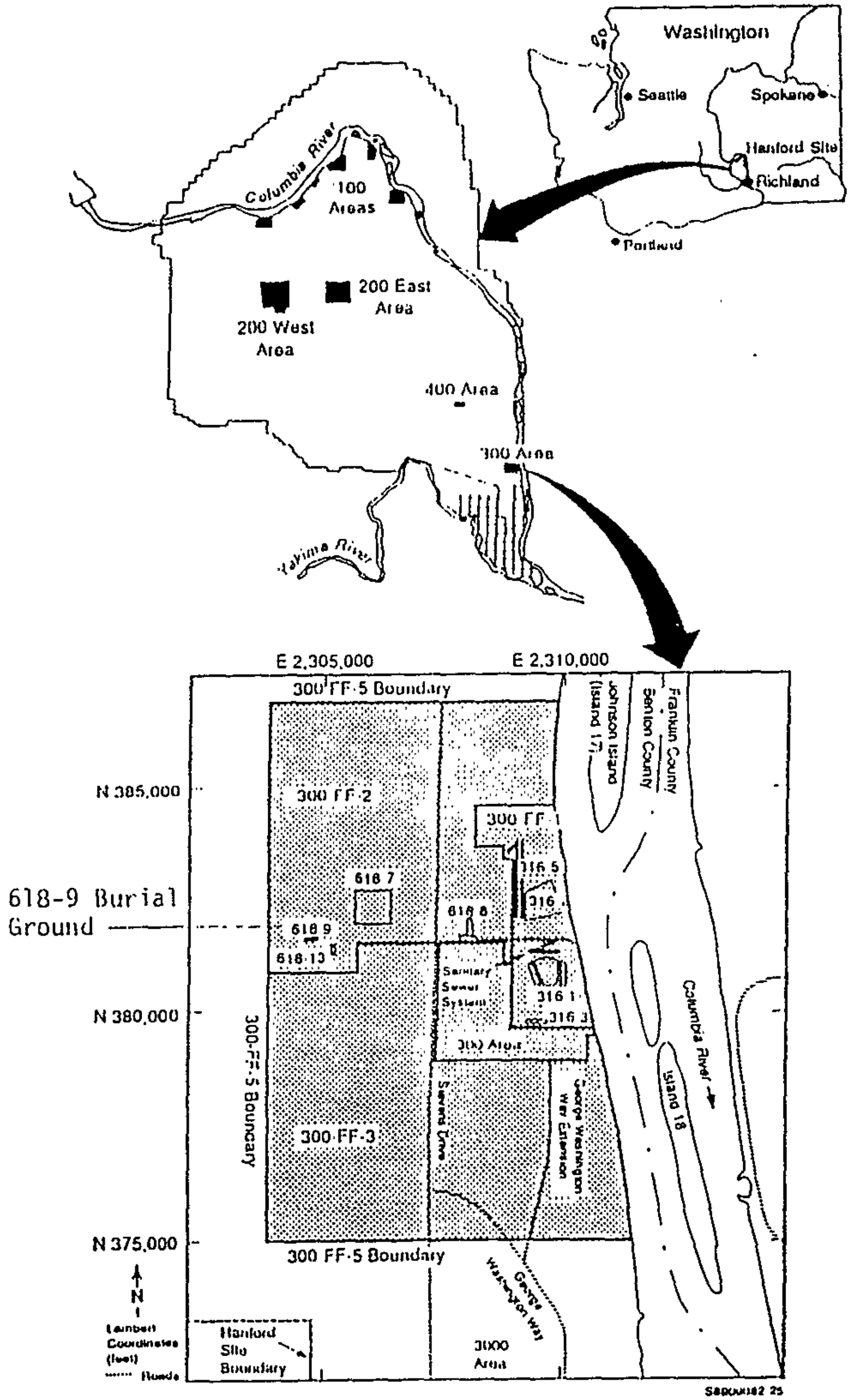

Figure 1. Location of 618-9 Burial Ground.

4.0 WASTE INFORMATION

The liquid wastes disposed of in the 618-9 Burial Ground originated from the 321 Building and have been in the DOE Hazardous Waste Site Information System. The data from this waste system suggest that 100 or more 55-gal drums containing approximately 5,000 gal of uranyl nitrate hexahydrate (UNH) in hexone (methyl isobutyl ketone) are present. The DOE data indicate that tributyl phosphate (TBP) may be present also. The total estimated ^{238}uranium buried in the trench is 3.1 Ci (9,000,000 g) (WHC 1991).

The lack of adequate historical documentation and oral interviews with former site personnel indicate that the data may not fully describe the materials discarded in the burial ground. This has been confirmed from current excavations. In addition to the buried drums, building debris and miscellaneous waste items have been found in the trench. The interviews indicated that carbon tetrachloride and kerosene (normal paraffin hydrocarbon) may be present, and that the organic solution may have been "double distilled" to remove the UNH solution. The actual number of drums and their contents will be documented before initiation of soil sampling.

5.0 PROJECT MANAGEMENT

The Environmental Engineering Group (EEG) has the overall lead responsibility for the project. Responsibilities of key personnel and organizations are described as follows.

- **Project Lead.** The project lead will be responsible for the overall coordination of activities; responsibilities include the planning and authorization of work, management of any subcontracted activities, schedule, and budgetary performance.

- **Quality Engineer.** The quality engineer is responsible for oversight of performance of the quality requirements by means of internal auditing and surveillance techniques. The quality engineer retains the necessary organizational independence and authority to identify conditions adverse to quality and to inform the project lead of needed corrective action.

- **Field Coordinator.** The field coordinator is responsible for direction and coordination of all field activities including excavations, waste transfer, sampling, and the documentation generated in response to these activities.

- **Site Safety Officer.** The site safety officer is responsible for determining potential health and safety hazards from volatile and/or toxic compounds during excavation and sampling and has the responsibility and authority to halt field activities due to health and safety hazards.

- **Sampling Field Team Leader.** The sampling field team leader is responsible for onsite direction of the sampling team, implementing all applicable environmental investigation instructions (EII), and has direct control of the field logbook in accordance with the requirements of this sampling and analysis plan.

- **Sampling Team.** The sampling team will containerize and transport samples to the appropriate laboratory and will provide all necessary sampling equipment.

- **Restoration and Remediation Health and Safety.** Restoration and Remediation Health and Safety (formerly Health Physics) is responsible for preparing and issuing the Radiation Work Permit (RWP) and will provide health physics technician (HPT) support for field activities.

- **The Office of Sample Management.** The Office of Sample Management (OSM) is responsible for designating and providing an interface with the laboratory, and the analytical laboratory validation of all analytical data, and for transmitting completed data packages to the EEG for interpretation.

6.0 SAFETY

A hazardous waste operations permit (HWOP) prepared in accordance with EII 2.1, Preparation of Hazardous Waste Operations Permits (WHC 1988) has been generated for the field activities. Job-specific activities will be delineated in the HWOP and will provide guidance for appropriate personnel protection equipment, site monitoring, chemical/radiological hazards and potential safety hazards associated with the field/site environment. Included in the HWOP will be an RWP and an emergency response plan. All safety-related documents and sampling plans will be reviewed by field personnel before work commencement. A pre-job safety meeting and regular field-safety "tailgate" meetings will be held to review all safety considerations and identify any potential hazards not previously noted. Field personnel who enter the controlled zones will have received the appropriate training to be qualified as a hazardous waste worker as outlined in EII 1.1, Hazardous Waste Site Entry Requirements.

7.0 SAMPLING ACTIVITIES

7.1 SAMPLING LOCATIONS

This sampling plan provides guidance for field activities related to the collection of authoritative and random samples from the excavated trench at 618-9 Burial Ground. Trench plans and a cross section are shown in Figure 2 depicting information to date on findings of excavation activities. Based on the excavation, the overall trench will be divided (horizontally) into three sections for sampling purposes. As shown in Figure 2, the three sections are: (1) west end of trench containing drums, (2) central part of trench containing miscellaneous debris, and (3) east end, a continuation of miscellaneous and drum debris. Initially, sections 1 and 3 will be sampled with section 2 being sampled at a later date after the remaining debris is removed. The sampling strategies applied to sections 1 and 3 should prove applicable to section 2, although the specifics are dependant on the completion of the excavation for that section.

For sampling of section 1, the soil will be separated (vertically) into three strata and sampled accordingly. Strata one will consist of the loose soil occurring from voids between drums and drum groupings, strata two will comprise the undisturbed soil (initial 2.5 to 30 cm [1 to 12 in.]) directly below the drums on the original trench bottom, and strata three will consist of samples collected below the initial 2.5 to 30 cm (1 to 12 in.) of undisturbed soil of strata two.

Samples taken from the three strata will include random and/or authoritative samples. Authoritative samples will be taken based on field observations such as (1) discolored soil, (2) hits on field safety instrumentation, and (3) at the discretion of the sampling field team leader. Sampling of strata two will be initiated at the interface between the previously disturbed soil and the nondisturbed sections. With the exception of strata one, sample sites will be exposed using a backhoe and samples will be taken from soils excavated by the backhoe bucket.

For strata three, a select few of the authoritative and/or random sites from strata two will be sampled deeper than the initial undisturbed surface samples (2.5 to 30 cm [1 to 12 in.]). Applicable field screening techniques will be conducted throughout the sampling effort and may aid in the selection of these sites. Sample sites will be exposed and subsequently sampled in the same manner as strata two. The expected maximum depth at which samples will be obtained is 4 ft below the original burial trench bottom.

A diagram showing drum distribution based on field observations during excavation activities is provided in Figure 3. A two-dimensional, 1-m (3-ft) grid system will be utilized in locating random sampling points. This grid will be composed of equidistant parallel lines at right angles to each other. Samples will be collected at the intersection points of the parallel lines which comprise the grid. If necessary, the sampler will have the option of collecting the sample within a radius of half the grid space from the selected point. A random numbers table will be generated for selection of sample points. In consideration of the potential lateral movement of contaminants originating from leaking drums, the grid system used to cover the trench may include a buffer zone extending beyond the defined trench boundary. The dimensions of the grid system and randomly selected sample points will be mapped and documented in the field logbook.

Figure 2. Plans/Sections of the 618-9 Trench.

9 2 1 2 6 1 7 0 6 2 4

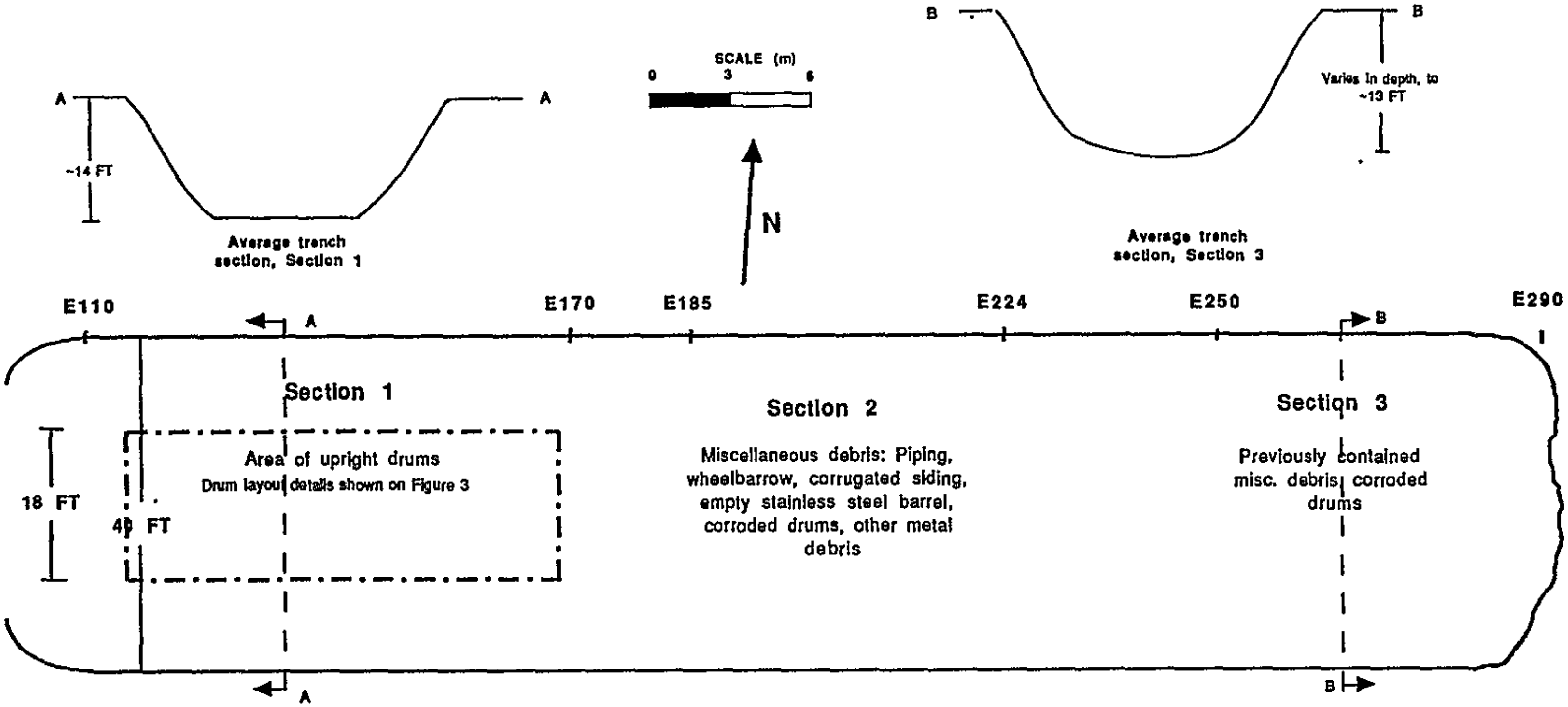

FIGURE 2: PLANS/SECTIONS OF THE 618-9 TRENCH

Figure 3. 618-9 BurialGround Drum Distribution.

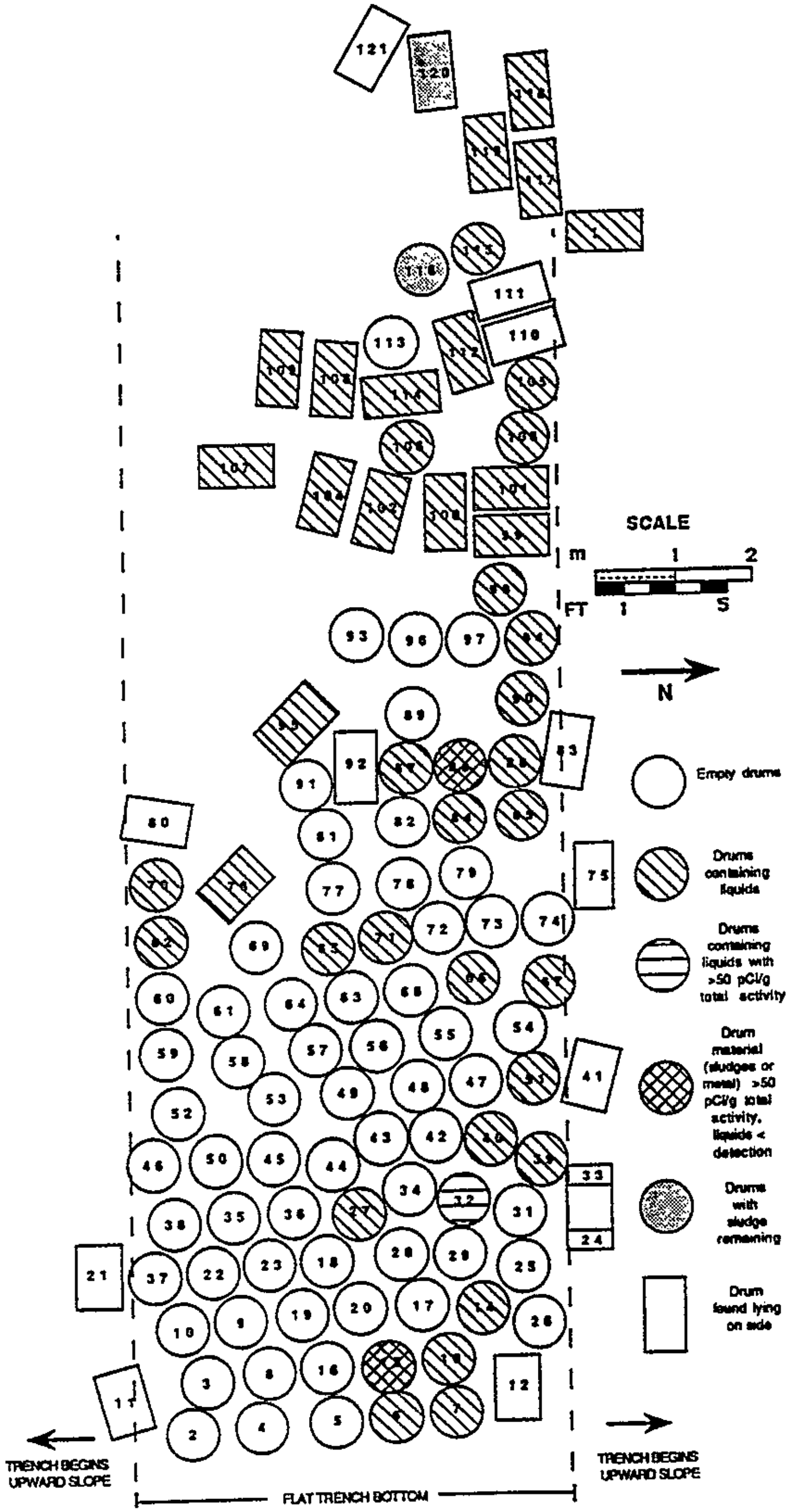

FIGURE 3: 618-9 BURIAL GROUND DRUM DISTRIBUTION

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In sections 2 and 3, construction debris and miscellaneous waste have been uncovered. Examples of the uncovered debris taken from these sections includes piping, steel grating, a swamp cooler, and corrugated aluminum siding. Some of the items of special interest from section 2 included a stainless steel drum (empty) and a bag of ammonia nitrate fertilizer. In addition to the previously mentioned debris, drum rings, badly corroded drums and wood pallets have been exposed in section 3. Random samples will be collected from these sites based on the grid design selected for section 1. Authoritative samples may be warranted based on field observations as indicated above.

A minimum of 20 samples will be collected throughout section 1 and a minimum of 10 samples in section 3. These samples will include both random and authoritative samples taken from the three vertical strata mentioned previously. Quality control samples to be taken in addition to these samples are addressed in Section 9.2, Quality Control Samples.

7.2 SAMPLE COLLECTION

All soil samples will be collected according to the protocols outlined in EII 5.2, Soil and Sediment Sampling. Using separate sampling equipment (stainless steel spoons or scoops) at each sample location, the sampler will collect the required amount of soil and fill the appropriate widemouth glass or plastic jars. Depending on conditions at each sample location, stainless steel screens, bowls, and scoops may be required to obtain soil samples in rocky substrates. On securing the caps and cleaning the exterior of all containers, the sample will be returned to the field team leader and the sampler will verify time of collection, sample location, field conditions, and any other pertinent information. Containers will be labeled and placed on ice. Prior to shipping, sample containers will be checked for sample integrity (i.e., broken bottles, caps, tight lids, etc.) secured with evidence tape and bagged to meet appropriate shipment requirements.

7.3 SAMPLING EQUIPMENT

Equipment used to collect the samples shall be decontaminated per EII 5.5, 1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment. Decontaminated stainless steel equipment to be used for sample collection may include the following: spoons, scoops, shovels, bowls, augers, screens, and funnels. A sufficient quantity of each item will be available for use at each individual sample site to prevent cross-contamination of samples.

8.0 SAMPLE ANALYSIS

Samples collected shall be analyzed in accordance with EPA protocols. Table 1 is a list of parameters of interest has been generated from existing documentation, recommendations from Westinghouse Hanford Solid Waste Engineering Analysis, and other technical personnel involved in the history of the site. Laboratory analysis for samples, excluding radiological and anion parameters, shall be performed to Level IV (contract laboratory procedure [CLP]) requirements. This will consist of quantitative analysis using procedures that require stringent quality assurance (QA) and quality control (QC) protocols and documentation.

Table 1. Parameters of Interest.

Parameters of Interest	Analytical Method
VOAs	CLP
Semivolatiles	CLP
Metals	CLP
PCBs	CLP
Anions	EPA 300
Gamma Scan	EML Procedures Manual (HASL-300)[a]
Total Uranium	EML Procedures Manual (HASL-300)[a]
Isotopic Uranium	EML Procedures Manual (HASL-300)[a]

[a]DOE Environmental Measurements Laboratory (DOE 1982).

9.0 DATA QUALITY OBJECTIVES

9.1 DATA NEEDS/USES AND ANALYTICAL LEVELS

The data collected shall be used to designate what treatment, if any, is required for the soil. Analytical Level IV (CLP), as defined by EPA (1987) shall be required. EPA methods (EPA 1982) shall be employed, where possible. Detection limits shall be those established in CLP guidelines or other implemented analytical procedures. The data quality objective for precision shall be 25 relative percentage difference (RPD) and for accuracy shall be 25%. In response to the complexity of the matrix and possible radioactive components, the data may be flagged, but will not be invalidated or disqualified if the data quality objectives are not met.

9.2 QUALITY CONTROL SAMPLES

The following QC samples shall be collected:

- Field duplicate samples. Duplicate QC samples are employed to document precision, the variability of the waste composition, the sampling technique, and the analytical technique. These shall be implemented at a frequency of 1 for every 20 samples at a minimum. Duplicate samples shall be collected for the analyses indicated in Chapter 8 and each set shall be labeled with separate sample designations.

- Trip blanks. Trip blanks are used to detect any contamination during handling and transportation. These usually consist of deionized water (or sand) (ASTM I) and are collected at a frequency of 1 for every 20 samples at a minimum. These blanks should accompany the sample containers to and from the field and are to be analyzed for volatile organics.

- Field blanks. Field blanks are used to detect contamination from conditions during sampling such as airborne contaminates that are not from the waste being sampled. These are collected at a frequency of 1 for every 20 samples at a minimum and are opened for the duration of the sampling event. Field blanks shall be collected for volatile organic analyses.

- Equipment blanks. Equipment blanks are used to detect any residual contamination following decontamination of the sampling equipment. Equipment blanks are implemented at a frequency of 1 for every 20 samples at a minimum.

- Split sample. A split sample will be analyzed by an alternate laboratory as verification of the designated laboratory data. These are collected at a frequency of 1 for every 20 samples at a minimum.

10.0 PROCEDURES

All sampling activities shall be administered per *Environmental Investigations and Site Characterization Manual* (WHC 1988).

11.0 DOCUMENTATION REQUIREMENTS

A field logbook shall be acquired, kept current, and dispositioned in accordance with EII 1.5, Field Logbooks. Chain-of-custody and sample analysis request forms shall accompany the samples to the laboratory. Procedures for the completion of these forms can be found in EII 5.1, Chain of Custody, and EII 5.2, Soil and Sediment Sampling. Remarks shall be written to the laboratory personnel noting any potential hazards associated with the sample. The project lead shall ensure that all documentation will be dispositioned in accordance with EII 1.6, Records Management.

12.0 SAMPLE CONTAINERS AND LABELS

Sample containers with full QA certification will be used. Labels shall be affixed to each sample container and include the following information: sample collector, sample number, date and time of collection, contact, etc.

13.0 TRANSPORTATION OF SAMPLES

All sample shipments shall be in accordance the *Hazardous Material Packaging and Shipping* (WHC 1989) and EII 5.11, Sample Packaging and Shipping. Data gathered from the preliminary sample analyses (total activity and field characterization) should be used in determining proper shipping requirements. Specific transportation procedures employed shall be documented in the field logbook.

14.0 MODIFICATIONS TO THE SAMPLING PLAN

Due to unforseen field conditions the optimal aspects of the sample design may not be achievable (i.e., equipment malfunction or breakdown, weather conditions, soil conditions, physical barriers). Modifications to the planned activity may be necessary as decided by the sampling field team leader. All modifications shall be recorded in the logbook along with circumstances requiring the action.

Circumstances or changing objectives may require major modifications of the basic sampling plan. In this situation, the sampling field team leader will submit the following information where applicable to the project file:

- sampling plan title
- section/subsection to be modified (chapter, title, page number), quoting section as given in sampling plan
- modifications or deviations, recording modified, deleted, or added statement
- technical summary of change
- approvals by original signers of the document or appropriate replacement.

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